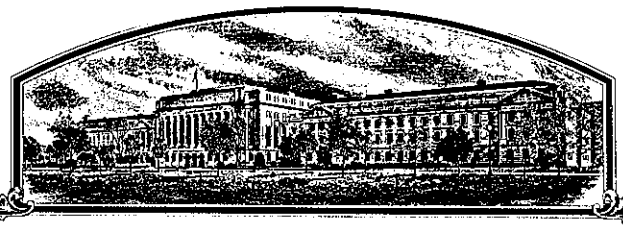
No. 8600084



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Busch Agricultural Resources, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF eighteen YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. THE UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS ... OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS ...BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

BARLEY

'B1602'

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the City of* Washington, D. C. *this* 29th *day of* March *in the year of our Lord one thousand nine hundred and* ninety-one.

Attest:

Kenneth A Evans

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Ed Madigan

Secretary of Agriculture

APPROVAL EXPIRES 4-30-86

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

FORM APPROVED: OMB NO. 0581-0055

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

1. NAME OF APPLICANT(S)	2. TEMPORARY DESIGNATION	3. VARIETY NAME
Busch Agricultural Resouces, Inc.	6B82-2870	B1602

4. ADDRESS (Street and No. or R.F.D. No., City, State, and Zip Code)	5. PHONE (Include area code)	FOR OFFICIAL USE ONLY
806 N. 2nd Street Berthoud, Colorado 80513	(303) 532-3721	PVPO NUMBER 8600084

6. GENUS AND SPECIES NAME	7. FAMILY NAME (Botanical)	FILING
Hordeum vulgare L.	Gramineae	DATE: March 17, 1986 TIME: 10:00 ☒ A.M. ☐ P.M.

8. KIND NAME	9. DATE OF DETERMINATION	FEES RECEIVED
Spring Barley	March 1, 1978 March 1, 1980	AMOUNT FOR FILING: $ 1800.00 DATE: March 17, 1986 AMOUNT FOR CERTIFICATE: $200.00 DATE: Feb. 19, 1991

10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION (Corporation, partnership, association, etc.)

Corporation

11. IF INCORPORATED, GIVE STATE OF INCORPORATION	12. DATE OF INCORPORATION
Delaware	1-1-81

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS

Dr. Melvern K. Anderson
Busch Agricultural Resources, Inc.
806 N. 2nd Street
Berthoud, Colorado 80513
(303) 532-3721 PHONE (Include area code)

or

C. Bruns
Nickerson American Plant Breeders Inc.
806 N. 2nd Street Berthoud, CO 80513

14 CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED

a. ☒ Exhibit A, Origin and Breeding History of the Variety *(See Section 52 of the Plant Variety Protection Act.)*
b. ☒ Exhibit B, Novelty Statement.
c. ☒ Exhibit C, Objective Description of Variety *(Request form from Plant Variety Protection Office.)*
d. ☒ Exhibit D, Additional Description of Variety.
e. ☒ Exhibit E, Statement of the Basis of Applicant's Ownership. Exhibit F, Quality Data

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See Section 83(a) of the Plant Variety Protection Act.)* ☒ Yes *(If "Yes," answer items 16 and 17 below)* ☐ No

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? ☒ Yes ☐ No

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED? ☒ Foundation ☒ Registered ☒ Certified

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.? ☐ Yes *(If "Yes," give date)* ☒ No

19. HAS THE VARIETY BEEN RELEASED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES ? ☐ Yes *(If "Yes," give names of countries and dates)* ☒ No

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT	DATE
Melvern K Anderson Busch Ag. Res.	2/26/86
SIGNATURE OF APPLICANT	DATE

FORM WA-470 (7-84) (Edition of 3-84 is obsolete.)

EXHIBIT A

Origin and Breeding History of B1602 (6B82-2870)

Pedigree: Bumper/6B78-628//Morex/6B78-628

Date of Cross: Each single cross was made in the spring 1979 greenhouse; the F1's were combined in a double cross in the fall 1979 greenhouse. The F1 was grown in the spring 1980 greenhouse.

History: F2 plants were grown at Hunter, North Dakota in 1980. A single seed from an F2 head selection was advanced by single seed descent in the fall 1980 greenhouse. An F4 head-row was selected in Hunter, North Dakota in 1981. Malting quality prediction tests on remnant F4 seed assisted in the selection of an F5 seed increase plot in Yuma, Arizona for yield testing an F2 derived F6 bulk at Hunter and St. Thomas, North Dakota in 1982. This line advanced to second year yield trials in 1983. In 1984 224 head selections were made to initiate purification and multiplication. These 224 head-rows were grown in 1985 and 206 were selected to serve as bulk breeder seed.

This seed served as the pure seed source and yield trial source. B1602 was tested in yield trials from 1982-1985 at Moorhead and Climax, Minnesota and Hunter and St. Thomas, North Dakota. Additional test sites in 1985 were at Borup and Stephen, Minnesota.

Purification was initiated in 1985. There were 224 head-rows grown at our Berthoud, Colorado location and 18 were discarded. These selected head-rows were harvested to form Breeder seed. Foundation seed was produced during the winter of 1985-86 at Yuma, Arizona.

Future head-rows will be grown as necessary to constitute Breeder seed. All seed production fields to date have been stable and uniform.

EXHIBIT B.

NOVELTY STATEMENT

B1602 is most similar to the spring barleys "Glenn" and "Bumper", however they can be distinguished by the following morphological characteristics:

- B1602 has a V-shaped collar on the stem. Bumper has a closed collar with a nick.
- B1602's lateral kernels overlap at the tip. Bumper's lateral kernels overlap from 1/4 to 1/2 of the head.
- B1602's glume length equals 1/2 of the lemma. Bumper's glume length equals more than 1/2 of the lemma.
- B1602 has few teeth on the lateral veins of the kernel. Bumper has numerous teeth on the lateral veins of the kernel.
- B1602 has higher malt extract and higher alpha amylase than Bumper or Glenn. Indirect comparisons are available only by B1602 comparison to Morex and Bumper and Glenn compared to Morex (see following page - quality table).
- B1602 is taller in height than Glenn, (see following page).
- B1602 has a more erect head type than Glenn.

EXHIBIT B - B1602

MALTING QUALITY SUMMARY
Morex, Glenn, Bumper 1978-1982
Morex, B1602 1982-1985

Variety	Kernel Plumpness Over 6/64 %	Protein Content			Malt Extract %	Diastatic Power	Alpha Amylase
		Malt %	Wort %	Soluble Protein %			
Morex	54	14.6	4.9	34	75.9	141	38
Glenn	61	14.7	4.6	32	74.8	142	32
Bumper	67	14.4	4.3	30	74.3	129	33
Morex	66	13.2	4.4	33	77.5	127	37
B1602	75	12.0	4.0	31	77.6	113	36

STATISTICAL TABLE FOR EXTRACT

Variety	Mean	$S\bar{d}$	$\bar{d}$	n	t
B1602	77.2				
Bumper	74.6	0.567	2.64	7	4.656**
Glenn	75.8	0.733	2.05	5	2.796*

*, ** The probabilty that the difference in the means of extract is significantly different at the 5% and 1% level, respectively.

STATISTICAL TABLE FOR ALPHA AMYLASE

Variety	Mean	$S\bar{d}$	$\bar{d}$	n	t
B1602	36			13	
Bumper	33	0.604	2.9	13	4.80**
Glenn	32	0.493	3.6	13	7.30**

* The probability that the difference in means of alpha amylase activity is significantly different at the 1% level.

STATISTICAL TABLE FOR HEAD ERECTNESS

Variety	Mean	Sd	d	n	t
B1602	2.4	0.371	1.32	14	3.558**
Glenn	3.7				

*** The probability that the difference in the means of head erectness is significantly different at the 1% level.

ST 12/3/90

1 = ERECT

3 = 90° OR HORIZONTAL

5 = DROOPING

STATISTICAL TABLE FOR PLANT HEIGHT

Variety	Mean	Sd	d	n	t
B1602	91.0 cm	1.197	4.13	14	3.45**
Glenn	86.9 cm				

** The probability that the difference in the means of plant height is significantly different at the 1% level.

STATISTICAL TABLE FOR HEADING DATE

Variety	Mean	$S\bar{d}$	$\bar{d}$	n	t
B1602	181.5	0.209	2.083	11	9.966**
Morex	179.4				

** The probability that the difference in the means of heading date is significantly different at the 1% level.

B1602

FORM APPROVED: OMB NO. 40-R3822

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, POULTRY, GRAIN & SEED DIVISION
BELTSVILLE, MARYLAND 20705

EXHIBIT C
(Barley)

OBJECTIVE DESCRIPTION OF VARIETY

BARLEY *(HORDEUM VULGARE)*

INSTRUCTIONS: *See Reverse.*

NAME OF APPLICANT(S)
Busch Agricultural Resouces, Inc.

ADDRESS *(Street and No. or R.F.D. No., City, State, and ZIP Code)*
806 N. 2nd Street
Berthoud, Colorado 80513

FOR OFFICIAL USE ONLY
PVPO NUMBER
8600084
VARIETY NAME OR TEMPORARY DESIGNATION
B1602

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (i.e. [0][8][9] or [0][9]) when number is either 99 or less or 9 or less.

1. GROWTH HABIT:

[1] 1 = SPRING 2 = FACULTATIVE WINTER 3 = WINTER [3] Early Growth: 1 = PROSTRATE 2 = SEMIPROSTRATE 3 = ERECT

2. MATURITY (50% Flowering):

[2] 1 = EARLY (California Mariout) 2 = MIDSEASON (Betzes) 3 = LATE (Frontier)

[ ] No. of days *Earlier* than . . . . . [ ]
[2] No. of days *Later* than . . . . . [9]
Equal to Bumper (8)
1 = BETZES 2 = CALIFORNIA MARIOUT 3 = CONQUEST 4 = DICKSON 5 = PIROLINE 6 = PRIMUS 7 = UNITAN 8=Bumper 9=Morex

3. PLANT HEIGHT (From soil level to top of head):

[4] 1 = SEMIDWARF 2 = SHORT (California Mariout) 3 = MEDIUM TALL (Betzes) 4 = TALL (Conquest)

[ ][ ] Cm. *Shorter* than . . . . . [ ]
[ ][ ] Cm. *Taller* than . . . . . [ ]
Equal to Bumper (8)
1 = BETZES 2 = CALIFORNIA MARIOUT 3 = CONQUEST 4 = DICKSON 5 = PIROLINE 6 = PRIMUS 7 = UNITAN 8=Bumper

4. STEM:

[3] Exertion *(Flag to spike at maturity)*: 1 = 0 - 3 cm. 2 = 3 - 10 cm. 3 = 10 - 15 cm.

[1] Anthocyanin: 1 = ABSENT 2 = PRESENT

[0][5] NO. OF NODES (Originating from node above ground)

[2] Collar Shape: 1 = CLOSED 2 = V-SHAPED 3 = OPEN 4 = MODIFIED CLOSED OR OPEN

[2] Shape of Neck: 1 = STRAIGHT 2 = SNAKY (slightly) 3 = OTHER (Specify) _____

5. LEAF:

[1] Basal leaf sheath *(seedling)*: 1 = GLABROUS 2 = PUBESCENT

[2] Position of flag leaf *(at boot stage)*: 1 = DROOPING 2 = UPRIGHT to 90 degree angle

[2] Waxiness: 1 = ABSENT (Glossy) 2 = SLIGHTLY WAXY 3 = WAXY

[2][0] MM. WIDTH (First leaf below flag leaf)

[2][3] CM. LENGTH (First leaf below flag leaf)

[1] Anthocyanin in leaf sheath: 1 = ABSENT 2 = PRESENT

6. HEAD:

[2] Type: 1 = TWO-ROWED 2 = SIX-ROWED

[1] Density: 1 = LAX 2 = ERECT (Not dense) 3 = ERECT (Dense)

[2] Shape: 1 = TAPERING 2 = STRAP 3 = CLAVATE 4 = OTHER (Specify) _____

[2] Waxiness: 1 = ABSENT (Glossy) 2 = SLIGHTLY WAXY 3 = WAXY

[2] Lateral Kernels Overlap: 1 = NONE 2 = AT TIP 3 = 1/4 - 1/2 OF HEAD

[3] Rachis *(Hair on edge)*: 1 = LACKING 2 = FEW 3 = COVERED

7. GLUME:

[2] Length: 1 = 1/3 OF LEMMA 2 = 1/2 OF LEMMA 3 = MORE THAN 1/2 OF LEMMA

[3] Hairs: 1 = NONE 2 = SHORT 3 = LONG

[4] Hair covering: 1 = NONE 2 = RESTRICTED TO MIDDLE 3 = CONFINED TO BAND 4 = COMPLETELY COVERED

[3] Awns: 1 = LESS THAN EQUAL TO LENGTH OF GLUMES 2 = EQUAL TO LENGTH OF GLUMES 3 = MORE THAN EQUAL TO LENGTH OF GLUMES

[3] Awn Surface: 1 = SMOOTH 2 = SEMISMOOTH 3 = ROUGH

B1602

8600084

8. LEMMA:

[5] Awn: 1 = AWNLESS 2 = AWNLETS ON CENTRAL ROWS, AWNLESS ON LATERAL ROWS 3 = SHORT ON CENTRAL ROWS, AWNLETS ON LATERAL ROWS 4 = SHORT (less than equal to length of spike) 5 = LONG (longer than spike) 6 = HOODED

[3] Awn Surface: 0 = AWNLESS 1 = SMOOTH 2 = SEMISMOOTH 3 = ROUGH

[2] Teeth: 1 = ABSENT 2 = FEW 3 = NUMEROUS

[1] Hair: 1 = ABSENT 2 = PRESENT

[3] Shape of base: 1 = DEPRESSION 2 = SLIGHT CREASE 3 = TRANSVERSE CREASE

[2] Rachilla Hairs: 1 = SHORT 2 = LONG

9. STIGMA:

[2] Hairs: 1 = FEW 2 = MANY

10. SEED:

[2] Type: 1 = NAKED 2 = COVERED

[1] Hairs on Ventral Furrow: 1 = ABSENT 2 = PRESENT

[2] Length: 1 = SHORT (8.0 mm.) 2 = SHORT TO MIDLONG (7.5 - 9.0 mm.) 3 = MIDLONG (8.5 - 9.5 mm.) 4 = MIDLONG TO LONG (9.0 - 10.5 mm.) 5 = LONG (10.0 mm.)

[2] Wrinkling of hull: 1 = NAKED 2 = SLIGHTLY WRINKLED 3 = SEMIWRINKLED 4 = WRINKLED

[1] Aleurone Color: 1 = COLORLESS (White or Yellow) 2 = BLUE

[0][0] PERCENT ABORTIVE

[3][5] GMS. PER 1000 SEEDS

11. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant) 3=Moderately Susceptible 4=Moderately Resistant

[0] SEPTORIA	[4] NET BLOTCH	[2] SPOT BLOTCH	[0] POWDERY MILDEW
[0] LOOSE SMUT	[0] BACTERIAL BLIGHT	[0] COVERED SMUT	[0] FALSE LOOSE SMUT
[2] STEM RUST	[2] LEAF RUST	[0] SCAB	[0] SCALD
[0] AY	[0] BSMV	[0] BYDV	[--] OTHER (Specify)

12. INSECT: (0 = Not tested, 1 = Susceptible, 2 = Resistant)

[0] GREEN BUG	[0] ENGLISH GRAIN APHID	[0] CHINCH BUG	[0] ARMYWORM
[0] GRASS HOPPERS	[0] CEREAL LEAF BETTLE	[--] OTHER (Specify)	

HESSIAN FLY RACES: [0] GP [0] A [0] B [0] C [0] D [0] E [0] F [0] G

13. CHEMICAL (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[0] DDT [--] OTHER (Specify)

14. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering	Bumper	Seed size	Bumper
Leaf size	Bumper	Coleoptile elongation	Bumper
Leaf color	Bumper	Seedling pigmentation	Bumper
Leaf carriage	Bumper		

REFERENCES: The following publications may be used as a reference aid for the standardization of character descriptions and terms used in this form:

1. Wiebe, G. A., and D. A. Reid, 1961, Classification of Barley Varieties Grown in the United States and Canada in 1958, Technical Bulletin No. 1224, U.S. Dept. of Agriculture.
2. Reid, D. A., and G. A. Wiebe, 1968, Barley: Origin, Botany, Culture, Winter Hardiness, Genetics, Utilization, Pests, Agriculture Handbook No. 338, U.S. Dept. of Agriculture. pp. 61 - 84.
3. Malting Barley Improvement Association, Milwaukee, Wisconsin, 1971, Barley Variety Dictionary.

COLOR: Nickerson's or any recognized color fan may be used to determine color of the described variety.

//

EXHIBIT D.

ADDITIONAL DESCRIPTION OF B1602

B1602 is a six-rowed spring barley developed by Busch Agricultural Resources, Inc. It is midseason in maturity and has excellent malting quality.

B1602 has an erect juvenile growth habit. The spike is lax in density with a semi-nodding head type. Lemma awn is long and rough. Rachilla, rachis and glume hairs are long. The glumes are completely covered with hair and the glume awns are more than equal to the length of the glumes. The aleurone is colorless and the hull is adhering and slightly wrinkled.

B1602 is adapted to the upper midwest barley producing areas.

EXHIBIT E.

STATEMENT OF THE BASIS OF APPLICANT'S OWNERSHIP

Busch Agricultural Resources, Inc. is the applicant for protection in this case being:

a. The incorporated business registered in Delaware for and within which regular employees have bred B1602.

b. The proprietory owner and intending commercial seller of B1602.

EXHIBIT F

QUALITY DATA B1602

EXHIBIT F - B1602

MALTING QUALITY SUMMARY
Morex, Glenn, Bumper 1978-1982
Morex, B1602 1982-1985

Variety	Kernel Plumpness Over 6/64 %	Protein Content			Malt Extract %	Diastatic Power	Alpha Amylase
		Malt %	Wort %	Soluble Protein %			
Morex	54	14.6	4.9	34	75.9	141	38
Glenn	61	14.7	4.6	32	74.8	142	32
Bumper	67	14.4	4.3	30	74.3	129	33
Morex	66	13.2	4.4	33	77.5	127	37
B1602	75	12.0	4.0	31	77.6	113	36